


PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 28 NOV 2005

Applicant's or agent's file reference 831-B-PCT	FOR FURTHER ACTION		See Form PCT/IPEA/416	PCT																								
International application No. PCT/US04/43422	International filing date (day/month/year) 23 December 2004 (23.12.2004)	Priority date (day/month/year) 23 December 2003 (23.12.2003)																										
International Patent Classification (IPC) or national classification and IPC IPC(7): A47J 31/40; 31/06 and US Cl.: 99/302R, 295																												
Applicant ELECTRICAL & ELECTRONICS LIMITED																												
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>18</u> sheets, as follows:</p> <div style="margin-left: 40px;"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>																												
<p>4. This report contains indications relating to the following items:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"><input checked="" type="checkbox"/></td> <td style="width: 20%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table>					<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input checked="" type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand 21 July 2005 (21.07.2005)		Date of completion of this report 31 October 2005 (31.10.2005)																										
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201		Authorized officer  Reginald L. Alexander Telephone No. 571-272-0987																										

Form PCT/IPEA/409 (cover sheet)(April 2005)

Box No. I Basis of the report

1. With regard to the **language**, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- ☐ the international application as originally filed/furnished
- ☒ the description:
pages 1-6,8,9 and 15 as originally filed/furnished
pages* 7,10-14 and 16-23 received by this Authority on 21 July 2005 (21.07.2005)
pages* NONE received by this Authority on _____
- ☒ the claims:
pages 24-28 and 30 as originally filed/furnished
pages* NONE as amended (together with any statement) under Article 19
pages* NONE received by this Authority on _____
pages* 29 received by this Authority on 11 August 2005 (11.08.2005)
- ☒ the drawings:
pages 1-7,9-12,14 and 15 as originally filed/furnished
pages* NONE received by this Authority on _____
pages* 8,13 and 16 received by this Authority on 11 August 2005 (11.08.2005)
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages none
- ☒ the claims, Nos. none
- ☒ the drawings, sheets/figs none
- ☒ the sequence listing (*specify*): none
- ☒ any table(s) related to the sequence listing (*specify*): none

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/43422

Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application

☒ claims Nos. 24

because:

☐ the said international application, or the said claim Nos. _____ relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 24 are so unclear that no meaningful opinion could be formed (*specify*):

There is no structure recited to define the claimed software program.

☐ the claims, or said claims Nos. _____ are so inadequately supported by the description that no meaningful opinion could be formed (*specify*):

☐ no international search report has been established for said claims Nos. _____

☐ a meaningful opinion could not be formed without the sequence listing; the applicant did not, within the prescribed time limit:

☐ furnish a sequence listing on paper complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ furnish a sequence listing in electronic form complying with the standard provided for in Annex C of the Administrative Instructions, and such listing was not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ pay the required late furnishing fee for the furnishing of a sequence listing in response to an invitation under Rules 13ter.1(a) or (b) and 13ter.2.

☐ a meaningful opinion could not be formed without the tables related to the sequence listings; the applicant did not, within the prescribed time limit, furnish such tables in electronic form complying with the technical requirements provided for in Annex C-bis of the Administrative Instructions, and such tables were not available to the International Preliminary Examining Authority in a form and manner acceptable to it.

☐ the tables related to the nucleotide and/or amino acid sequence listing, if in electronic form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

☐ See Supplemental Box for further details

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US04/43422**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)

Claims 1-23 and 25-35 YESClaims NONE NO

Inventive Step (IS)

Claims 1-23 and 25-35 YESClaims NONE NO

Industrial Applicability (IA)

Claims 1-23 and 25-35 YESClaims NONE NO

2. Citations and Explanations (Rule 70.7)

Claims 1-23 and 25-35 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the subject matter as claimed.

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requires the rotation of the control body. In contrast, the brewing head of the present invention only moves the upper member, i.e., the rotate to lock assembly. The lower member, i.e., the support base, of the brewing head of the present invention is fixed, but the filter holder assembly containing the filter can be removed completely for cleaning. Furthermore, the Domel et al device is only designed for coffee bags. The present invention is designed to use both ground coffee and coffee bag.

10 Torriani, U.S. Patent No. 1,750,068, relates to a device containing a circular filter-carrier adapted to slide in and out of a window. The filter-carrier is locked by rotating a collector below the filter-carrier to force the filter-carrier upward against the upper portion of the brew head. The device in Torriani patent has the design of a traditional espresso machine. The filter carrier can slide in and out, but to lock the filter carrier still requires blindly turning the thread on the collector.

20 Hatz, U.S. Patent No. 811,979, relates to a device for preparing coffee, which includes a pressure cooker for forcing heated water to the coffee percolator by stream pressure. The Hatz device uses a different method to prepare the coffee. Hatz uses a pressure cooker instead of a boiler system. Hatz also uses a preculator instead of the filter holder. The pressure cooker requires a stove or heating device to heat up the water. The coffee machine of the present invention uses electricity to bring the water to boil.

30 The foregoing objects and advantages of the present invention are illustrative of those that can be achieved by the present invention and are not intended to be exhaustive or limiting of the possible advantages which can be realized. Thus, these and other objects and advantages of the invention will be apparent from the description herein or can be learned from practicing the invention, both as embodied herein or as modified in view of any variation which may be apparent to those skilled in the art. Accordingly, the present invention resides

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The accompanying drawing illustrates diagrammatically non-limitative embodiment of the invention as follows:

5 One embodiment of this invention, hereinafter referred to as Construction I, is shown in Figure 1 to Figure 5.

10 **Figure 1** is a cross-sectional illustration of the brewing head assembly or unit of Construction I in the closed position. A: Top view. B: Side view.

Figure 2 is a cross-sectional illustration of the brewing head assembly or unit of Construction I in the opened position.

15 **Figure 3** is an exploded view of the brewing head assembly or unit of Construction I, comprising a rotate to lock assembly, a sealing assembly, a slide filter holder assembly, a separated boiler and a hose for delivering pressurized and/or heated water/steam from the boiler to the coffee chamber.

20 **Figure 4** is isometric view of the brewing head assembly or unit of Construction I in the opened position.

25 **Figure 5** is isometric view of the brewing head assembly or unit of Construction I in the closed position.

Another embodiment of this invention, hereinafter referred to as Construction II, is shown in Figure 6 to Figure 10.

30 **Figure 6** is a cross-sectional illustration of the brewing head assembly or unit of Construction II in the closed position. A: Top view. B: Side view.

35 **Figure 7** is a cross-sectional illustration of the brewing head assembly or unit of Construction II in the opened position. A: Top view. B:

Figure 8 is an exploded view of the brewing head assembly or unit of Construction II, comprising a rotate to lock assembly, a sealing assembly, a slide filter holder assembly, a separated boiler and a hose for delivering pressurized and/or heated water/steam from the boiler to the coffee chamber.

Figure 9 is isometric view of the brewing head assembly or unit of Construction II in the opened position.

Figure 10 is isometric view of the brewing head assembly or unit of Construction II in the closed position.

Another embodiment of this invention, hereinafter referred to as Construction III, is shown in Figure 11 to Figure 16.

Figure 11 is a cross-sectional illustration of the brewing head assembly or unit of construction III in the closed position. A: Top View. B: Side View.

Figure 12 is a cross-sectional illustration of the brewing head assembly or unit of construction III in the opened position. A: Top View. B: Side View.

Figure 13 is a exploded view of the brewing head assembly or unit of construction III, comprising a rotate to lock assembly, a sealing assembly, a slide filter holder assembly, a separated boiler and hose for delivering pressurized and/or heater water/steam from the boiler to the coffee chamber.

Figure 14 is isometric view of the brewing head assembly or unit of construction III in an opened position showing the filter holder slide into the brewing head assembly or unit of construction.

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Figure 15 is isometric view of the brewing head assembly or unit of construction III in the closed position.

Figure 16 is a cross-sectional illustration of the brewing assembly or unit of construction III in closed position. The section view shows the stopper on the rotation pole to keep the moving rod stopped on the inter lock position. A: Top View. B: Side View.

DETAILED DESCRIPTION OF THE INVENTION

It is the object of this invention to provide a cabinet design of the filter holder. This invention provides a boiler or heating system which is separate from the brewing head unit of the coffee machine and a locking mechanism.

This invention provides a locking mechanism which is advantageous over prior art in that the filter holder unit does not need to be turned for it to lock. We only need slide in the filter holder and rotate down the handle. It is easier to operate and more efficient than the traditional turning lock mechanism.

I. Rotate to Lock Assembly of Construction I

This invention provides a brewing head assembly or unit (See Figure 1-5) of a coffee maker comprising: a rotate to lock assembly, a sealing assembly and a filter holder assembly or unit, operatively linked to sustain pressure of at least 5 bars. In an embodiment, the above-described rotate to lock assembly, sealing assembly, and filter holder assembly or unit are operatively linked and are capable of sustaining advantageously at least 10 bars of pressure. In another embodiment, the above-described rotate to lock assembly, sealing assembly, and filter holder assembly or unit are operatively linked and are capable of sustaining advantageously at least 15 bars of pressure. In a further embodiment, the above-described rotate to lock assembly, sealing assembly, and filter holder assembly or unit are operatively

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linked and are capable of sustaining advantageously at least 20 bars of pressure.

5 This invention provides a rotate to lock assembly comprising handle
12 movably joined to a rotate plate 11, a rotate rod 10 and a top
frame 1 by a fixed pin 13, at a position as indicated by arrow D in
Figure 4. A back connection plate 8 is fixed on one end to the top
frame, at the positions as indicated by arrows B and D in Figure 4,
and movably joined to a support base 14 on another end, at a position
10 as indicated by arrow A in Figure 4. A front connection plate 9 is
moveably joined to rotate plate on one end, at a position as indicated
by arrow C in Figure 4, and to the support base 14 on another end,
at a position as indicated by arrow E. In an embodiment, the rotate
to lock assembly is as shown in Figure 3.

15 This invention provides a sealing assembly comprising a seal ring
4, which is inserted between a water connection plate 2 and a water
spreader 6. A water outlet valve 3, which contains a water outlet
spring 5, is inserted through the center of the water spreader 6,
20 seal ring 4, and the water connection plate 2. The water outlet valve
3, the water outlet spring 5, the seal ring 4, the water spreader
6 are fixedly attached to the water connection plate 2 by a water
outlet valve holder 7. The water connection plate is fixedly attached
to the top frame. The water connection plate 2 contains an opening
25 31 for connecting the water connection plate 2 to a hose 20 for delivering
heated and/or pressurized fluid from a boiler 19 through the sealing
assembly to the brewing chamber. In an embodiment, the sealing assembly
is as shown in Figure 3.

30 The water outlet valve holder 7 is the nut which holds the water spreader
6, water outlet spring 5, seal ring 4, and the water outlet valve
3 to the water connection plate 2.

35 This invention provides a filter holder assembly/unit comprising a
filter 15, filter handle 16, filter holder 17 and coffee chamber 18.

3.

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- This invention provides a brewing head assembly or unit, i.e., See Figure 6-10, of a coffee maker comprising: a rotate to lock assembly, a sealing assembly and filter holder assembly, operatively linked to sustain pressure of at least 5 bars. In an embodiment, the
- 5 above-described rotate to lock assembly, sealing assembly, and filter holder assembly are operatively linked, and are capable of sustaining advantageously at least 10 bars of pressure. In another embodiment, the above-described rotate to lock assembly, sealing assembly, and
- 10 filter holder assembly are operatively linked and are capable of sustaining advantageously at least 15 bars of pressure. In a further embodiment, the above-described rotate to lock assembly, sealing assembly, and filter holder assembly are operatively linked and are capable of sustaining advantageously at least 20 bars of pressure.
- 15 This invention provides a rotate to lock assembly, comprising a handle, a top frame, a connecting plate, a hinge pin, a cam pin and a support base. In an embodiment, the rotate to lock assembly is as shown in Figure 8.
- 20 This invention provides a sealing assembly, comprising a seal ring, a water connection plate, a water outlet valve, a water outlet spring, a water spreader, and a water outlet valve holder. In an embodiment, the sealing assembly is as shown in Figure 8.
- 25 This invention provides a filter holder assembly or unit, comprising a filter, a filter handle, a filter holder and a coffee chamber. In an embodiment, the filter holder assembly or unit is as shown in Figure 8.
- 30 The operation of the locking mechanism of an embodiment of the present invention, i.e., Construction II, is as follows:
- To prevent the leakage of water from the brewing head, a silicone rubber seal ring 4 is used on the brewing head unit. The silicone
- 35 rubber seal 4 is fixed between a water connection plate 2 and a water

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 spreader 6 by a water outlet valve holder 7. See Figure 8.

5 To operate the rotate to lock assembly, a handle 12 is rotated upwards
 in the direction of arrow W until the handle 12 is 90 degrees with
 the horizontal. See Figure 9. A cam pin 8.11 is linked to the handle
 12, at a position as indicated by arrow H in Figure 9. When the cam
 pin 8.11 rotates, it causes the connection plate 8.3 to rise up in
 the direction of arrow U. The connection plate 8.3 is linked to the
 10 top frame 8.1 by two hinge pins 8.2 on both side, at the positions
 as indicated by arrows I and K. The clamp force on the filter holder
 17 is released by lifting the connection plate 8.3 with the cam pin
 8.11 and handle 12. Once the brewing head assembly or unit is in the
 opened position, the user can insert or slide-in the filter holder
 15 holder assembly or unit in the direction of arrow V, or pull out the filter
 holder assembly or unit. See Figure 9.

20 To brew coffee, the filter holder assembly or unit is inserted into
 the cabinet filter holder housing located on the support base 8.12
 of the brewing head assembly or unit. Then the handle 12 is rotated
 downward to the locked or closed position. See Figure 10. The cam
 pin 8.11 will force the connection plate 8.3 downward. The connection
 plate 8.3 and cam pin 8.11 configuration will create a clamp force
 capable of maintaining pressure- and/or water-tight seal up to at
 least 20 bars against the filter holder assembly. The filter holder
 25 is sealed by a seal ring 4 and with the clamp force created by the
 cam pin 8.11 and the connection plate 8.3.

30 Figure 8 is the exploded view of the brewing head assembly or unit
 of Construction II showing the components of the rotate to lock assembly,
 the sealing assembly and the filter holder assembly.

35 As shown in Figure 8, the metal handle 12 rotates upward to unlock
 the brewing head unit. The handle is linked to cam pin 8.11 and the
 connection plate 8.3 by a screw. When the handle moves, the cam pin
 8.11 will rotate. The irregular shape of the cam pin will cause the

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connection plate 8.3 to rise up because the connection plate 8.3 is connected to the top frame 8.1 by the hinge pin 8.2 on both sides. The connection plate will also cause the top frame 8.1 to rise up slightly. The inclination angle between the top frame 8.1 and the support base 8.12 is about 10 degrees. This angle is just enough for the filter holder assembly or unit to slide in and out of the brewing head unit. After the filter holder assembly or unit is inserted into the brewing head unit, the handle can be rotated downward to lock the filter holder assembly or unit.

The sealing assembly of the brew head assembly or unit of Construction II is composed of a top frame 8.1, a water connection plate 2, a seal ring 4, a water outlet valve 3, a water outlet spring 5, a water spreader 6 and a water outlet valve holder 7. The water outlet valve holder 7 is the nut which holds the water spreader 6, water outlet spring 5, seal ring 4, and water outlet valve 3 to the water connection plate 2. The sealing assembly is fixed to the top frame 8.1 by one or more screw. Water outlet valve 3 and water outlet spring 5 is used to prevent water leakage from the water spreader 6 under low pressure during the water heating stage. Hot water is released when the pump pressure is greater than the force exerted by the water outlet spring 5, which is around 5 Bar. When the hot water makes contact with the coffee, the pump pressure will increase to at least 10 to 20 bars. Then the coffee will flow out to the cup.

To brew coffee, the user needs to slide the filter holder assembly or unit into the brewing head assembly or unit. The filter holder assembly or unit is comprised of a filter 15, a filter handle 16, filter holder 17 and the coffee chamber 18. The coffee is placed on the filter 15, and then the filter 15 is inserted into the filter holder 17. The coffee chamber 18 collects and releases the brewed coffee.

In another aspect of the invention, a motor is operatively linked to the rotate plate, rotate rod and front connection plate of

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Construction I or cam pin and connection plate of Construction II.

The motor, which duplicates the functions performed by the handle, can be adapted by one of ordinary skill in the art to rotate the rotate plate and rotate rod to of the front connection plate of Construction I or the cam pin of Construction II to lock or unlock the brewing head assembly. A set of gears may be connected to the cabinet filter holder unit and the motor so that the movement of the cabinet filter holder is made automatic without manual intervention. In an embodiment, a button is pressed to open the rotate and lock assembly to allow the user to place the filter with coffee into the cabinet filter holder assembly or unit. The user then press a button to operate the motor used to slide in the cabinet and close the lock and/or the brewing head unit. In another aspect of the invention, the motor can be operated by remote control.

III. Rotate to Lock Assembly of Construction III

This invention provides a brewing head assembly or unit, as illustrated in Figures 11-16, of a coffee maker comprising: a rotate to lock assembly, a sealing assembly and a filter holder assembly or unit, operatively linked to sustain pressure of at least 5 bars. In an embodiment, the above-described rotate to lock assembly, a sealing assembly and a filter holder assembly or unit, operatively linked to sustain pressure of at least 10 bars. In an embodiment, the above-described rotate to lock assembly, a sealing assembly and a filter holder assembly or unit, operatively linked to sustain pressure of at least 15 bars. In further embodiment, the above-described rotate to lock assembly, a sealing assembly and a filter holder assembly or unit, operatively linked to sustain pressure of at least 20 bars of pressure.

This invention provides a rotate to lock assembly, comprising a handle 12, a rotation pole 13.20 having a protruding member 20A, a moving rod 22, a support base 13.17 having two protruding members 17A, a copper shaft 23, a slider plate 13.1 having upper protruding member 1A and lower protruding member 1B, a slider plate holder 13.15, a

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shower head 13.14 and four brushing short 13.3.

5 the rotation pole 13.20 are moveably joined to the protruding member
17A of the support base 13.17, at a position as indicated by arrow
A in Figure 14. One end of the moving rod 22 is moveably joined to
the protruding member 20A of the rotation pole 13.20 by a copper shaft
23, at a position as indicated by arrow B in Figure 14, and the other
end of the moving rod 22 is movably joined to the upper protruding
member 1A of the slider plate 13.1, at a position as indicated by
10 arrow C in Figure 14. The slider plate 13.1 is guided by the slider
plate holder 13.15 with four brushing short 13.3, which are moveably
joined to the upper and lower protruding member 1A and 1B, respectively,
at a position as indicated by arrow D in Figure 14. The slider plate
holder 13.15 is attached to the support base 13.17. The shower head
13.4 is attached to the bottom of the slider plate 13.1. In an embodiment,
15 the rotate to lock assembly is as shown in Figure 13.

This invention provide a sealing assembly comprising a seal ring 24,
when is installed on to the shower head 13.4. A water spreader 6 is
fixedly attached to shower head 13.4 by spreader holder 13.6. In an
20 embodiment, the seal ring is fabricated from silicon rubber, or
elastomeric or other suitable material capable of providing
water-tight and/or pressure-tight seal under pressure and/or elevated
temperature. Suitable materials which can be used to fabricate the
seal ring are readily determinable by one of ordinary skill in the
25 art. In another embodiment, the sealing assembly is as shown in Figure
13.

This invention provides a filter holder assembly or unit, comprising
a filter 13.7, filter basket 13.8 and a filter handle 13.10. In an
30 embodiment the filter is fabricated from metal, plastic or other
suitable material. Suitable materials which can be used to fabricate
the filter are readily determinable by one of ordinary skill in the
art. In another embodiment, the filter holder assembly or unit is
as shown in Figure 13.

35

~~Patented by the U.S. Patent Office~~
The operation of the locking mechanism of an embodiment of the present invention, i.e., Construction III, is as follows:

5 To prevent the leakage of the water from the brewing head, a silicone rubber seal ring 24 is used on the brewing head assembly or unit. The silicone rubber sealing ring 24 is fixed onto the shower head 13.4. See Figure 13.

10 To operate the rotate to lock assembly, a handle 12 is rotated upwards in the direction of arrow E, as shown in Figure 14, until the metal handle 12 is approximate 100 degrees with the horizontal. See Figure 14. A rotation pole 13.20 is moveably linked to each side of the handle 12 at a position as indicated by arrow A in Figure 14. When the rotation pole 13.20 rotates, it causes the moving rod 22 to swing up in the
15 direction of arrow F, as shown in Figure 14. The upward movement of the moving rod 22 causes the slider plate 13.1 to move upward, as indicated by arrow G in Figure 14. The shower head 13.4, which is attached to the bottom of the slider plate 13.1 also moves upward with the slider plate 13.1. See Figure 14. The clamp force on the
20 filter holder 13.11 is released by lifting the shower head 13.4 with the rotation pole 13.20 and the handle 12. Once the brewing head assembly or unit is in the opened position, the user can insert or slide-in the cabinet filter holder assembly or unit in the direction of arrow H, as shown in Figure 14, or pull out the filter holder assembly or
25 unit. See Figure 14.

To brew coffee, the cabinet filter holder 13.11 is inserted into the support base 13.17 of filter holder assembly or unit. The cabinet filter holder 13.11 is supported by a filter holder support plate
30 13.18 attached to the bottom of the support base 13.17. The cabinet filter holder 13.11 can also be supported by guides located on either side of the cabinet filter holder 13.11, i.e., see 11A, and corresponding recesses or protrusions located on the support base 13.17. Then the handle 12 is rotated downward in the direction of arrow K, as shown
35 in Figure 15, until the handle is 0 degree or parallel with the horizontal

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to the locked or closed position. The rotation pole 13.20 has a stopper

to make the moving rod 22 stop at a pre-selected position, for example to stop or hold the handle 12 at about parallel to the horizontal.

See Figure 15 and 16. The downward movement of the handle 12 causes the rotation pole 13.20 and the moving rod 22 to swing or move downward.

And causes the slider plate and the sealing assembly or unit to also move downward and lower into the filter basket 13.8. See Figure 15.

Once the sealing assembly or unit is lowered into the filter basket 13.8, the compression force exerted on the sealing ring 24 by the

shower head 13.4 through the rotate to lock assembly on the filter basket 13.8 will form water- and/or pressure-tight seal between the

filter basket 13.8 and the shower head 13.4. In an embodiment, the sealing ring can seal up to at least 20 bars. During the brewing cycle,

the hot water and/or steam is released from the boiler 13.19 and/or heating system when the pump is turn on. The steam and/or hot water

are delivered into the area between the shower head 13.4 and the filter basket 13.8 by a suitable tube. The pressure, i.e., from the pump,

will make the shower head move upward in the direction of arrow L, as shown in Figure 16B, which also causes the moving rod swing upward

in the direction of arrow M, as shown in Figure 16B. The stopper 20B, as shown in Figure 16B, on the rotation pole will prevent the moving

rod 22 from swinging upward completely. The stopper 20B ensures that the inter-locking force on the shower head 13.4 is maintained so that

the sealing assembly or unit can not be un-lock.

To brew coffee, the user needs to slide the filter holder assembly or unit into the brewing head assembly or unit. The filter holder

assembly or unit is comprised of a filter 13.7, a filter basket 13.8, filter handle 13.10, a foam system 13.9 and a cabinet filter holder

13.11. The coffee is placed on the filter basket 13.8, and then the filter is inserted into the cabinet filter holder 13.11. The filter

holder collects and releases the brewed coffee.

In another aspect of the invention, a motor is operatively linked

to the rotation pole 13.20 of the brewing head of Construction III.

The motor, which duplicates the function of the motor in Construction II, can be adapted by one of the ordinary skill in the art to rotate the rotation pole 13.20 of the brewing head of Construction III to lock or un-lock the brewing head assembly. A set of gears may be connected to the motor so that

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head unit. In another aspect of the invention, the motor can be operated by a remote control.

FIG. 1

the rotation pole, which causes the moving rod to swing or move downward; wherein the slider plate which is attached to one end of the moving rod lowers the shower head onto the filter basket; wherein the seal ring on the shower head forms a water- and pressure-tight seal, capable of sustaining pressure up to 20 bars.

26. The brewing head according to claim 25, wherein the filter holder assembly further comprises the foam maker for producing foam coffee or coffee with froth.

27. The brewing head according to claim 26, wherein the foam maker is attached to the bottom of the filter basket.

28. The brewing head according to claim 25, wherein the rotate to lock assembly further comprises a stopper 20B attached to at least one protruding member 17A of the support base.

29. The brewing head according to claim 28, wherein the stopper is adapted to prevent rotate to lock assembly from unlocking while under pressure.

30. The brewing head according to claim 29, wherein the holding spring 13.16 is adapted to hold the shower head at a partially open position.

31. The brewing head according to claim 25, wherein the opening and closing of the rotate to lock assembly is driven by at least one motor.

32. The brewing head according to claim 31, wherein the motor is operated by a remote control.

33. The brewing head according to any one of claims 25-32, wherein the cabinet filter holder is inserted horizontally from the side of the support base.

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Figure 8

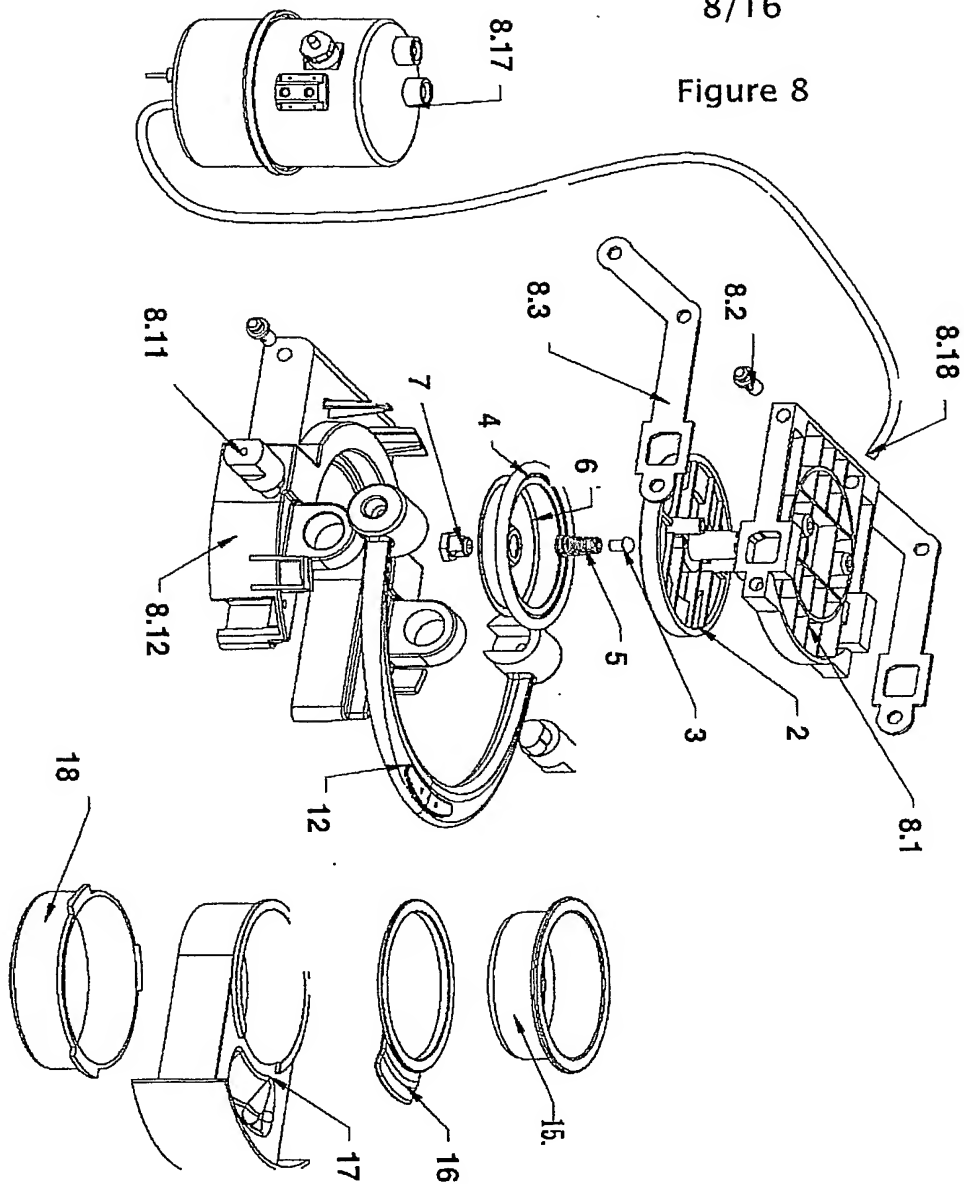


FIGURE 8

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Figure 13

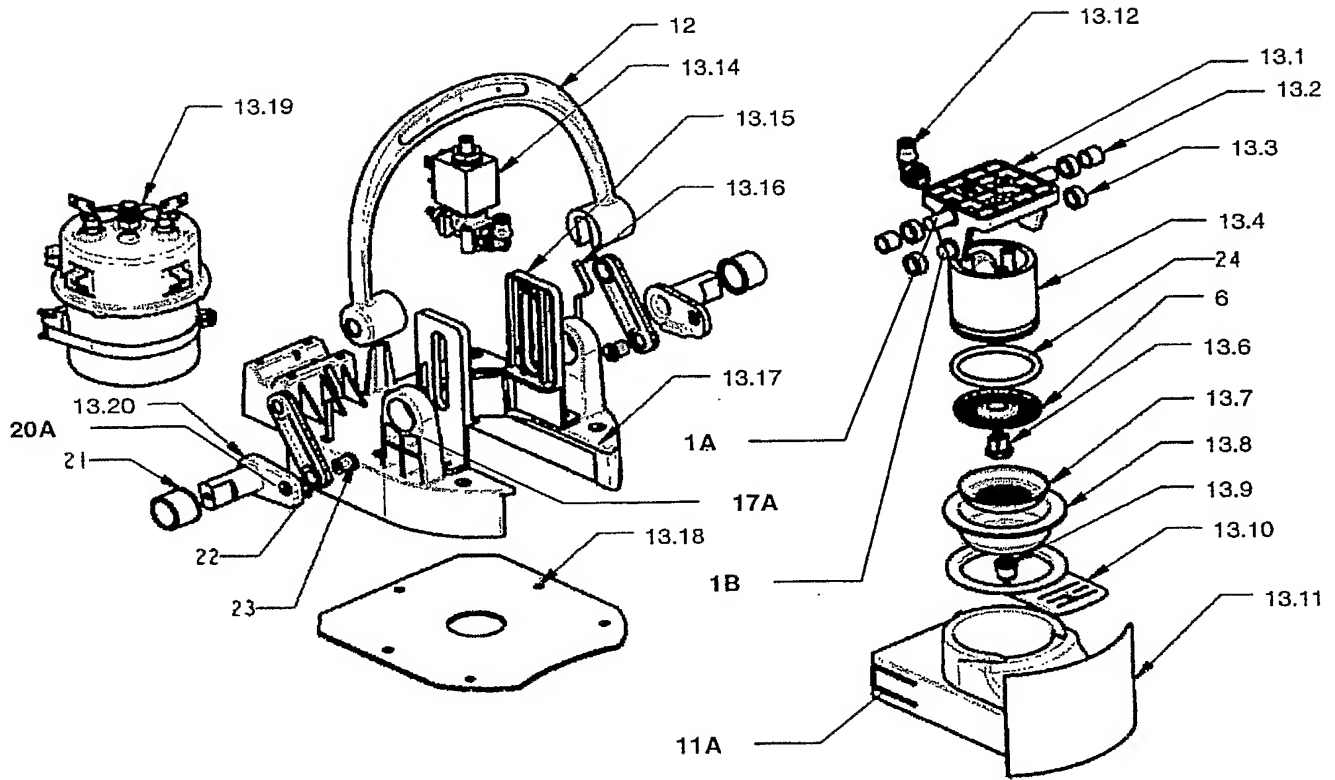
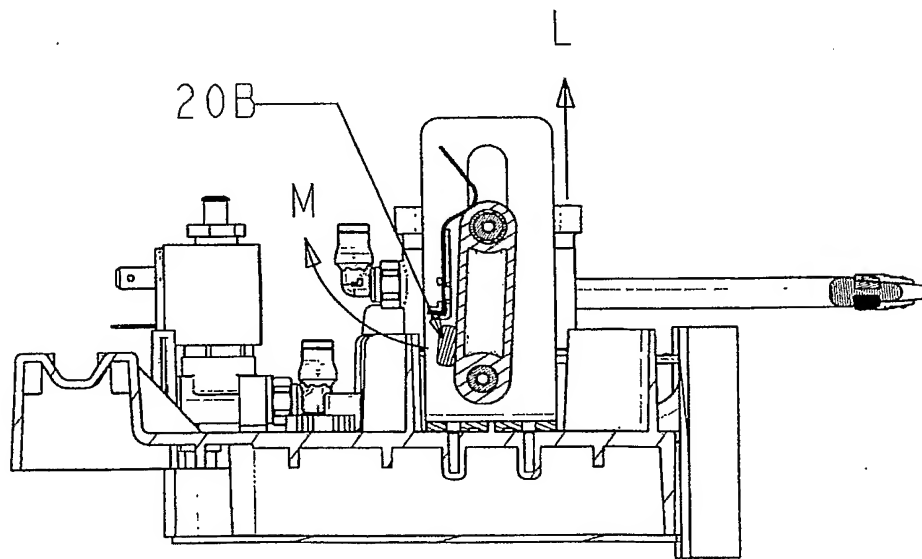
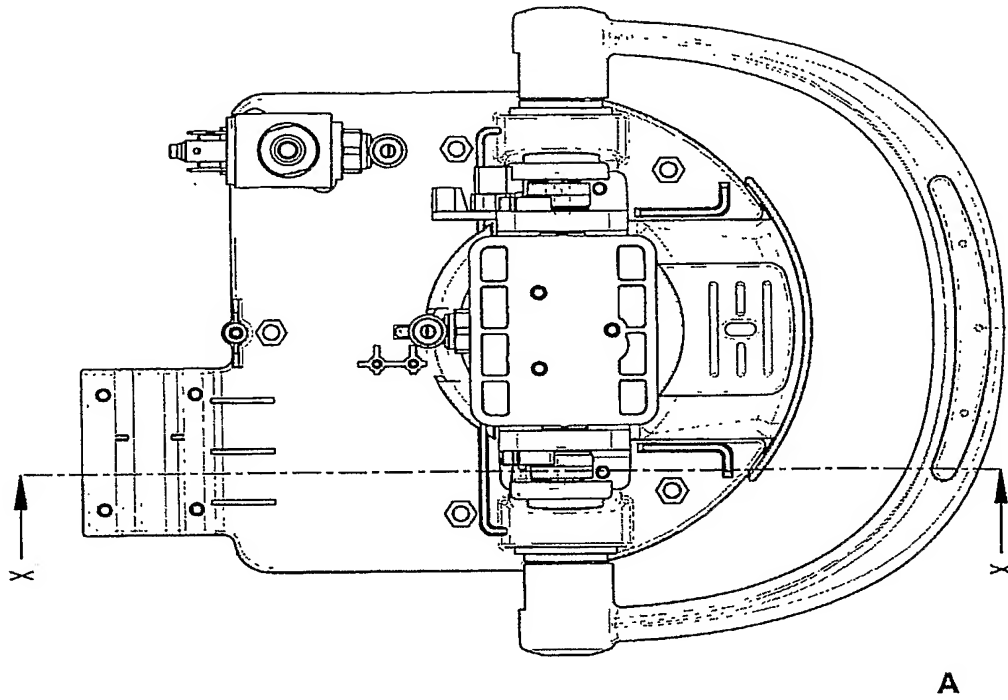


Figure 16



SECTION X-X